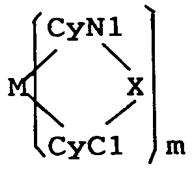
WHAT IS CLAIMED IS:

1. A metal coordination compound represented by the following formula (1):

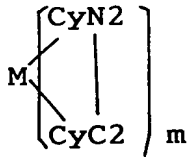
$$LmML'n \qquad (1),$$

wherein M denotes Ir, Pt, Ph or Pd; L denotes a bidentate ligand; L' denotes a bidentate ligand different from L; m is an integer of 1, 2 or 3; and n is an integer of 0, 1 or 2 with the proviso that the sum of m and n is 2 or 3,

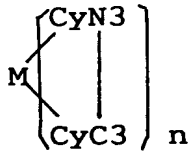
the partial structure MLm being represented by a formula (2) or a formula (3) shown below, and the partial structure ML'n being represented by a formula (4) or a formula (5) shown below:



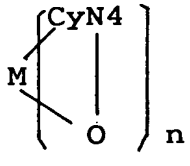

(2),




(3),




(4),




(5),

wherein CyN1, CyN2 and CyN3 independently denote a substituted or unsubstituted cyclic group containing a nitrogen atom connected to M; CyN4 denotes a cyclic group containing 8-quinoline or its derivative having a nitrogen atom connected to M; CyC1, CyC2 and CyC3 independently denote a substituted or unsubstituted cyclic group containing a carbon atom connected to M,

each of substituents for CyN1, CyN2, CyN3, CyC1, CyC2 and CyC3 being selected from the group consisting of a halogen atom; cyano group; nitro

group; a trialkylsilyl group containing three linear or branched alkyl groups each independently having 1 - 8 carbon atoms; a linear or branched alkyl group having 1 - 20 carbon atoms capable of including one or at least two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and capable of including a hydrogen atom which can be replaced with a fluorine atom; and an aromatic ring group capable of having a substituent selected from the group consisting of a halogen atom; cyano group; nitro group; and a linear or branched alkyl group having 1 - 20 carbon atoms capable of including one or at least two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and capable of including a hydrogen atom which can be replaced with a fluorine atom,

CyN1 and CyC1 being connected via a covalent group containing X which is represented by -O-, -S-, -CO-, -C(R1)(R2)- or -NR- where R1, R2 and R independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkyl group substituted with a halogen atom, a phenyl group or a naphthyl group, and

CyN2 and CyC2, and CyN3 and CyC3 being independently connected via a covalent bond,

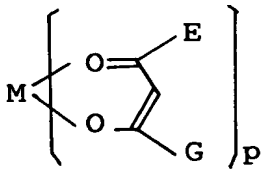
with the proviso that the metal coordination

compound is represented by the formula (2) when n is 0.

2. A compound according to Claim 1, wherein the partial structure MLm is represented by the formula (2).

3. A compound according to Claim 2, wherein M is Ir.

4. A compound according to Claim 2, wherein the metal coordination compound has another partial structure represented by the following formula (6):




(6),

wherein M denotes Ir, Pt, Ph or Pd; p is 1; and E and G independently denote a linear or branched alkyl group having 1 - 20 carbon atom capable of including a hydrogen atom which can be replaced with a fluorine atom, or an aromatic ring group capable of having a substituent selected from the group consisting of a halogen atom; cyano group; nitro group; a trialkylsilyl group containing three linear or branched alkyl groups each independently having 1 - 8 carbon atoms; and a linear or branched alkyl group having 1 - 20 carbon atoms capable of including one or

at least two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and capable of including a hydrogen atom which can be replaced with a fluorine atom.

5. A compound according to Claim 1, which exhibits a phosphorescence at the time of energy transition from an excited state to a ground state.

6. A compound according to Claim 1, wherein one of the ligands L and L' is a luminescent ligand and the other ligand is a carrier transport ligand.

7. A compound according to Claim 1, wherein at least one of the ligands L and L' is in a metal to ligand charge transfer excited state.

8. A compound according to Claim 1, wherein the ligands L and L' includes a first ligand capable of providing a first maximum luminescence wavelength $\lambda 1$ based on an excited state thereof and a second ligand capable of providing a second maximum luminescence wavelength $\lambda 2$ shorter than $\lambda 1$, the number of the first ligand providing $\lambda 1$ being smaller than that of the second ligand providing $\lambda 2$.

9. A compound according to Claim 1, wherein the

ligands L and L' includes a stronger luminescent ligand and a weaker luminescent ligand, the number of the stronger luminescent ligand is smaller than that of the weaker luminescent ligand.

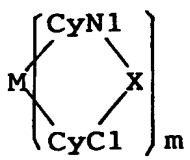
10. An organic luminescence device, comprising: a substrate, a pair of electrodes disposed on the substrate, and a luminescence function layer disposed between the pair of electrodes comprising at least one species of an organic compound,

wherein the organic compound comprises a metal coordination compound represented by the following formula (1):

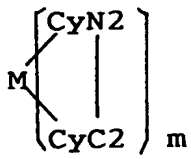
$$LmML'n \qquad (1),$$

wherein M denotes Ir, Pt, Ph or Pd; L denotes a bidentate ligand; L' denotes a bidentate ligand different from L; m is an integer of 1, 2 or 3; and n is an integer of 0, 1 or 2 with the proviso that the sum of m and n is 2 or 3,

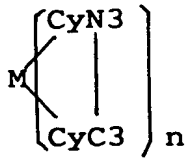
the partial structure MLm being represented by a formula (2) or a formula (3) shown below, and the partial structure ML'n being represented by a formula (4) or a formula (5) shown below:



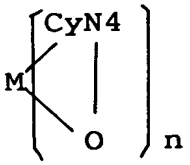

(2),




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wherein CyN1, CyN2 and CyN3 independently denote a substituted or unsubstituted cyclic group containing a nitrogen atom connected to M; CyN4 denotes a cyclic group containing 8-quinoline or its derivative having a nitrogen atom connected to M; CyC1, CyC2 and CyC3 independently denote a substituted or unsubstituted cyclic group containing a carbon atom connected to M,

each of substituents for CyN1, CyN2, CyN3, CyC1, CyC2 and CyC3 being selected from the group consisting of a halogen atom; cyano group; nitro group; a trialkylsilyl group containing three linear or branched alkyl groups each independently having 1 - 8 carbon atoms; a linear or branched alkyl group having 1 - 20 carbon atoms capable of including one or at least two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and capable of including a hydrogen atom which can be replaced with a fluorine atom; and an aromatic ring group capable of having a substituent selected from the group consisting of a halogen atom; cyano group; nitro group; and a linear or branched alkyl group having 1 - 20 carbon atoms capable of including one or at least two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and capable of including a hydrogen atom which can be replaced with a fluorine atom,

CyN1 and CyC1 being connected via a covalent group containing X which is represented by -O-, -S-, -CO-, -C(R1)(R2)- or -NR- where R1, R2 and R independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkyl group substituted with a halogen atom, a phenyl group or a naphthyl group, and

CyN2 and CyC2, and CyN3 and CyC3 being independently connected via a covalent bond,

with the proviso that the metal coordination compound is represented by the formula (2) when n is 0.

11. A device according to Claim 10, wherein the partial structure MLm is represented by the formula (2).

12. A device according to Claim 11, wherein M is Ir.

13. A device according to Claim 10, wherein a voltage is applied between the pair of electrodes to cause phosphorescence from the luminescence function layer.

14. An image display device, comprising: an organic luminescence device according to Claim 10 and

means for supplying electrical signals to the organic luminescence device.

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